

1660055/2023/HEP-CIE40800



BHARAT HEAVY ELECTRICALS LIMITED BHOPAL

PRE QUALIFICATION REQUIREMENT(PQR)

PI NO.- 242130006

Date: 18.08.2023

Sl. No.	Description	Vendor's remarks (Y/N)
1.	The vendor should be either manufacturer of RIP bushings as per BHEL Enquiry <u>OR</u> their authorized representative. Authorized representative to submit authorization letter from the manufacturer as a documentary proof.	
2.	<u>420KV RIP Bushing:</u> The manufacturer should be approved by NTPC for 420KV RIP bushings (or higher voltage ratings) as on bid opening date. Supplier to submit NTPC approval letter/drg/type test reports in support of the same.	

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Engineer (BCE)

Approved by: Singiren.E.Kandulna
Manager (BCE)

K.M.NAIK
[HOD/BCE] 02/09/23

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**BHARAT HEAVY ELECTRICAL LIMITED, BHOPAL****SPECIFICATION CUM COMPLIANCE CERTIFICATE OF 420kV, 2000A RIP BUSHINGS****NOTE:-**

- 1 The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.
- 2 The offer and all documents enclosed with offer should be in English language only.

NAME & ADDRESS OF THE SUPPLIER :		NAME & ADDRESS OF THE INDIAN AGENT :	
TELEPHONE NOS.:		TELEPHONE NOS.:	
FAX NOS.:		FAX NOS.:	
E-MAIL ADDRESS :		E-MAIL ADDRESS :	
SCOPE: SUPPLY OF 420 KV, 2000A, BIL - 1550KVp, P.FREQ VOLTAGE - 750KVrms, RESIN IMPREGNATED PAPER (RIP) CONDENSER BUSHINGS COMPLYING WITH THE SPECIFICATIONS AS BELOW :			
Spec No. : BCE/PS/420/14 Rev 01			
Date: 21.09.2021			
SR.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED	REMARKS
1.0	WORKPIECE MATERIAL		
1.1	Item :		
	420 KV, 2000A, BIL - 1550KV, P.Freq. Voltage -750KV rms, Resin Impregnated Paper (RIP) Condenser Bushing	Vendor to note	
2.0	SPECIFICATION :		
2.1	Bushings shall be robust and designed for adequate cantilever strength to meet the requirement of seismic condition, substation layout and movement along with the spare Transformer/ Reactor with bushing erected and provided with proper support from one foundation to another foundation within the substation area.	Vendor to Confirm	
2.2	The electrical and mechanical characteristics of bushings shall be in accordance with IEC: 60137/DIN 42530. All details of the bushing shall be submitted for approval and design review during contract stage.	Vendor to Confirm	

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2.3	The bushing shall be provided with tap for capacitance and tan delta test. Test taps relying on pressure contacts against the outer earth layer of the bushing is not acceptable.	Vendor to Confirm	
2.4	Where current transformers are provided, the bushings shall be removable without disturbing the current transformers.	Vendor to Confirm	
2.5	Bushings of identical rating shall be interchangeable to optimise the requirement of spares.	Vendor to Confirm	
2.6	These bushings are for NTPC India contracts and shall be manufactured meeting their requirements. Drawings, Quality and test schedules etc shall be got approved by BHEL/ NTPC before commencement of manufacturing.	Vendor to Confirm	
2.7	Polymer / Composite Insulator		
2.7.1	The hollow silicone composite insulators shall comply with the requirements of the IEC publications IEC 61462 and the relevant parts of IEC 62217.	Vendor to Confirm	
2.7.2	The design of the composite insulators shall be tested and verified according to IEC 61462 (Type & Routine test).	Vendor to Confirm	
2.7.3	Polymer / composite insulator shall be seamless sheath of a silicone rubber compound.	Vendor to Confirm	
2.7.4	The housing & weather sheds should have silicon content of minimum 30% by weight.	Vendor to Confirm	
2.7.5	It should protect the bushing against environmental influences, external pollution and humidity.	Vendor to Confirm	
2.7.6	It shall be extruded or directly moulded on the core.	Vendor to Confirm	
2.7.7	The interface between the housing and the core must be uniform and without voids.	Vendor to Confirm	
2.7.8	The strength of the bond shall be greater than the tearing strength of the polymer.	Vendor to Confirm	
2.7.9	The manufacturer shall follow non-destructive technique (N.D.T.) to check the quality of jointing of the housing interface with the core.	Vendor to Confirm	
2.7.10	The technique being followed with detailed procedure and sampling shall be finalized during finalization of MQP.	Vendor to Confirm	

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2.7.11	The weather sheds of the insulators shall be of alternate shed profile as per IEC 60815 The weather sheds shall be vulcanized to the sheath (extrusion process) or moulded as part of the sheath (injection moulding process) and free from imperfections.	Vendor to Confirm	
2.7.12	The vulcanization for extrusion process shall be at high temperature and for injection moulding shall be at high temperature & high pressure.	Vendor to Confirm	
2.7.13	Any seams / burrs protruding axially along the insulator, resulting from the injection moulding process shall be removed completely without causing any damage to the housing.	Vendor to Confirm	
2.7.14	The track resistance of housing and shed material shall be class 1A4.5 according to IEC 60587.	Vendor to Confirm	
2.7.15	The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer.	Vendor to Confirm	
2.7.16	The composite insulator shall be capable of high pressure washing.	Vendor to Confirm	
2.8	End fittings shall be free from cracks, seams, shrinks, air holes and rough edges.	Vendor to Confirm	
2.9	End fittings should be effectively, sealed to prevent moisture ingress, effectiveness of sealing system must be supported by test documents.	Vendor to Confirm	
2.10	All surfaces of the metal parts shall be perfectly smooth with the projecting points or irregularities which may cause corona.	Vendor to Confirm	
2.11	All load bearing surfaces shall be smooth and uniform so as to distribute the loading stresses uniformly.	Vendor to Confirm	
2.12	Clamps and fittings shall be of hot dip galvanised/stainless steel.	Vendor to Confirm	
2.13	Bushing turrets shall be provided with vent pipes, to route any gas collection through the Buchholz relay.	Vendor to Confirm	
2.14	No arcing horns shall be provided on the bushings.	Vendor to Confirm	
2.15	Bushings shall be provided with provision for long term storage to protect from moisture and rodents. The oil side shall be provided with tank which can be filled with oil. Tank shall have necessary provision for oil filling, level gauge etc. Suitable covering to be provided on air end side to protect from any damage. The arrangement shall be suitable for storage in horizontal / vertical direction in outdoor location.	Vendor to Confirm	
2.16	The terminal marking and their physical position shall be as per IEC: 60076.	Vendor to Confirm	

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2.17	Bushing handling and lifting tools shall be supplied alongwith each bushing for which cost shall be deemed included.		Vendor to Confirm	
2.18	Valid type test report for all type tests as per IEC : 60137 including Snap Back / Seismic test for 420KV of similar design conducted not earlier than 5 years from the bid opening date, shall be submitted alongwith the bid. The Type Test reports conducted at third party lab or witnessed by third party shall be submitted.		Vendor to Confirm	
2.19	In case valid type test report as mentioned under Sr. No. 2.18 above is not available, then vendor has to conduct type test in presence of BHEL / Customer representative before the delivery of first lot , at no extra cost.		Vendor to Confirm	
3	Technical Parameters			
3.1	Rated Voltage	420 kV	Vendor to specify	
3.2	Rated Current (Min.)	2000 A	Vendor to specify	
3.3	Lightning impulse withstand voltage	1550 kVp	Vendor to specify	
3.4	Switching impulse withstand voltage	1175 kVp	Vendor to specify	
3.5	One minute power frequency withstand voltage	750 kVrms	Vendor to specify	
3.6	Minimum total creepage distances	10500 mm	Vendor to specify	
3.7	Tan delta of bushings	< 0.004	Vendor to specify	
3.8	Max partial discharge level at Um	< 10 pC	Vendor to specify	
3.9	Test tap voltage withstand level	2 kVrms	Vendor to specify	
3.10	CT space min.	400 mm	Vendor to specify	
3.11	Oil End Length	1640mm	Vendor to specify	
3.12	Type of Lead	Draw Rod/ Bottom Palm type based on NTPC approval.	Vendor to confirm	
4.0	DOCUMENTATION : Following documents in English language should be sbmitted along with the bid for our evaluation		Vendor to Confirm	
4.1	OGA Drawing		Vendor to submit	
4.2	Guranteed Technical Particulars		Vendor to submit	
4.3	Manufacturing Quality Plan		Vendor to submit	

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4.4	Type test reports	Vendor to submit	
4.5	Catalogues, O&M Manuals	Vendor to submit	
5.0	GUARANTEE :		
5.1	12 months from the date of commissioning of the system and 18 months from the date of supply, whichever is later.	Vendor to Confirm	
6.0	ROUTINE TEST INSPECTION:	Vendor to confirm	
6.1	Routine tests may be witnessed by BHEL/ NTPC representatives at supplier's works.	Vendor to confirm	
6.2	Air-fare, boarding & lodging for the BHEL /NTPC representatives shall be borne by BHEL/ NTPC.	Vendor to note	
6.3	Competent, English speaking experts shall be arranged by the vendor during inspection.	Vendor to Confirm	

Note:Min. Arcing length =3500mm